MICHIGAN DEPARTMENT OF NATURAL RESOURCES
FISHERIES DIVISION

STATUS OF THE FISHERIES

IN MICHIGAN WATERS OF

LAKE ERIE AND LAKE ST. CLAIR

2002

A typical Lake St. Clair channel catfish

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Highlights for 2002

The purpose of this report is to provide an update on the status of the fisheries in the Great Lakes and connecting waters of southeast Michigan. Sources of information used in compiling this report include creel surveys, charter boat reports, an angler diary program, the Master Angler program, and commercial fishery records, as well as fisheries research studies. Some of the 2002 highlights described in detail include:

- *Lake Erie yellow perch abundance has increased in recent years, whereas walleye abundance has declined. Walleye experienced very good reproduction in 1999, but very poor or below average reproduction in 1995, 1998, 2000, and 2001.*
- *Non-charter catch rates for Lake Erie walleye decreased in 2002, while yellow perch catch rates improved. Angler effort increased, but remained consistent with the levels observed since 1995.*
- *Charter boat catch rates for Lake Erie walleye were about three times higher than those estimated for non-charter anglers, while yellow perch catch rates were about twice those estimated for non-charter anglers.*
- *Entries in the Master Angler Program clearly show that Lake St. Clair is the premier Michigan water for trophy muskellunge and smallmouth bass.*
- *The trap net survey of Lake St. Clair in 2002 revealed a channel catfish population with a high proportion of Master Angler-sized individuals.*
- *A bacterial disease, previously unknown in the Great Lakes, was found in Lake St. Clair muskies. Further research is needed to determine the implications of the infection on the muskie population.*
- *Long-term walleye tagging studies on Lake Erie illustrate the important contribution of Lake Erie walleye to the Great Lakes sport fishery of Southeast Michigan, from Port Huron to Toledo.*
- *Tagging studies of lake sturgeon in the connecting waters since 1997 have demonstrated that lake sturgeon routinely move between Lake St. Clair and southern Lake Huron.*

Fishery Forecast for 2003

Annual variation in the reproductive success of walleye and yellow perch can result in substantial year to year changes in the abundance of these species. Harvestable-size yellow perch abundance will be about the same as last year in Lake Erie and Lake St. Clair, with strong contributions from the 2000 and 1998 year classes. Legal-sized walleye numbers will decline in 2003 and the average size will be smaller as the 2001 year class enters the fishery. Walleye abundance is expected to decline further in 2004 and sport fishing regulations will likely be revised. Muskie and bass numbers tend to remain more stable from year to year and both species should continue to provide excellent fishing opportunities in 2003, particularly in Lake St. Clair and the Detroit River. However, weather conditions can affect sport fishing success as much as fish abundance. Therefore it is difficult to predict fishing success. Water levels are forecasted to remain low again this year, which may restrict angler access to some traditional fishing areas in the connecting waters. The success of marsh spawning species such as northern pike and largemouth bass could be negatively influenced in the short-term, but will eventually benefit from regeneration of coastal marshes.

Sport Fishery Summary

An on-site creel survey conducted by the Michigan Department of Natural Resources (MDNR) produced a total harvest estimate of 657,597 fish (Table 1) for Michigan's 2002 Lake Erie sport fishery (non-charter). In combination, walleye and yellow perch accounted for 96% of the total harvest, illustrating the importance of the percids in the sport fishery. Estimated angler effort in 2002 increased, but remained consistent with levels observed since 1993 (Figure 1). The walleye catch rate declined slightly in 2002, while the yellow perch catch rate increased (Figure 2). Since the 1980's, walleye catch rate increases generally coincide with decreases in yellow perch catch rates and vice versa. We suspect this is a result of shifts in angler effort for whichever species is providing the best fishing in a particular year. Trends in angler effort and catch rates for walleye and yellow perch since the mid-1980's suggest that the level of angler effort on Lake Erie is affected by many factors in addition to catch rates. Other factors, including weather, abundance of prey fish species, fishing success on other Great Lakes waters, and regional economic conditions have likely contributed to the comparatively low level of fishing effort since 1991.

Biological data were collected from walleye and yellow perch during the 2002 on-site creel survey. Age 3 fish (1999 year class) dominated the walleye harvest, comprising 63% of the catch (Figure 3). Harvested age 2, 3, and 4 walleye averaged 371 mm (14.6 in.), 431 mm (16.9 in.), and 466 mm (18.3 in.) in total length. The overall average length of walleye harvested in the sport fishery in 2002 was 456 mm (17.9 in.).

Yellow perch harvest was dominated by age 4 fish (1998 year-class), which accounted for 40% of the total harvest (Figure 3). In combination, age 3 (29%), 5 (13%), and 6 (15%) contributed 57% of the total harvest. Average lengths of harvested age 2, 3, and 4 yellow perch were 187 mm (7.4 in.), 209 mm (8.2 in.), and 224 mm (8.8 in.), respectively. The observed mean length at age for yellow perch taken in the Michigan sport fishery in 2002 remained below the levels of the mid-1990's, but similar to those of the early 1990's (Figure 4). We suspect that increased abundance in recent years has resulted in slower growth for perch in western Lake Erie.

Since 1989, Michigan charter boat operators have been required to report their charter fishing catch and effort to the MDNR. In 2002, Michigan charter boat anglers harvested 85,206 fish from Lake Erie (Table 2). Walleye (42%) and yellow perch (56%) were the major species harvested, accounting for 98% of the catch. Charter boat walleye catch rates were more than three times higher than those estimated for non-charter anglers in 2002, while yellow perch charter catch rates were nearly double the rate for non-charter boat anglers.

On Lake St. Clair and the St. Clair River, charter boat anglers harvested 13,731 fish (Table 3). Yellow perch (72%), "other" species (19%), and walleye (9%) made up the bulk of the catch. The "other" species category is thought to consist mainly of smallmouth bass and muskellunge.

During the period since 1990, walleye catch rates have remained relatively high for Lake Erie charter boat anglers (Figure 5), but declined markedly after 1990 for Lake St. Clair charters (Figure 6). In 2002, the charter catch rate for Lake Erie walleye remained consistent with levels typical of the 1990's. Over the last 10 years, the walleye charter catch rate for Lake Erie has been about 4 times higher than the Lake St. Clair rate. This difference may be a reflection of much lower walleye densities in Lake St. Clair throughout this time period. The number of reported charter excursions on Lake St. Clair in 2002 declined, possibly a reflection of the lower walleye catch rate for the year (Figure 7).

Lake Erie charter boat catch rates for yellow perch increased to the highest level observed since the charter boat reporting program was initiated in 1989 (Figure 5). Yellow perch catch rates for charter boats on Lake St. Clair have been more variable (Figure 6), but also reached a high level in 2002. The seasonal nature of the yellow perch fishery differs between the two lakes. In 2002, the Lake Erie yellow perch charter fishery was most active in August and September, while the Lake St. Clair fishery was more evenly distributed from July to October.

Despite the lack of creel survey data for Lake St. Clair, it is apparent that the muskellunge fishery exceeds that of any other period in modern history. Angler reports indicate spectacular catch rates. Muskellunge catch rates derived from the Angler Diary Program on Lake St. Clair verify these reports (Figure 8). We believe the quality of the Lake St. Clair muskellunge fishery is also reflected in the MDNR's Master Angler Program. The total number of muskellunge from Lake St. Clair entered for Master Angler Awards in 2002 exceeded 50 fish for the sixth consecutive year (Figure 9). The number of fish over 30 pounds remained above the numbers recorded prior to 1991. We believe that factors contributing to the consistent high quality of this fishery include: 1) a positive response to increased minimum size limits on both sides of the lake since the mid-1980's; 2) physical and biological changes in the lake such as clearer water and increased aquatic plant growth resulting in improved habitat for muskellunge; and, 3) increased voluntary catch and release fishing for muskies in Lake St. Clair by both sport and charter anglers.

Statistics from the Master Angler program also indicate that Lake St. Clair is the premier waterbody in the state for trophy smallmouth bass. Lake St. Clair accounted for 26% of all smallmouth bass entries in 2002 (catch/keep and catch/release programs combined). Since the early 1990's, both catch/keep and catch/release Master Angler smallmouth bass entries from Lake St. Clair have exhibited an increasing trend (Figure 10). Catch/release entries have outnumbered catch/keep entries for the last three years. The strong representation of Lake St. Clair smallmouth bass in the statewide Master Angler

Program is likely a reflection of an abundance of trophy-size smallmouth bass in the lake, a high degree of angler effort targeting the species, and a strong catch-and-release ethic among smallmouth bass anglers.

Commercial Fishery Summary

In 2002, only one Michigan commercial fishing license was active on Lake Erie. This state licensed commercial seine operation in the shallow embayments along Michigan's Lake Erie shoreline harvested 9 species of fish for a total of 448,925 pounds (Table 4). In combination, common carp (75%), buffalo (10%) and channel catfish (9%) accounted for 94% of the total harvest by weight. The total value of the 2002 Lake Erie commercial harvest from Michigan waters was estimated at $91,150.

Summary of Netting Surveys

During most years since 1978, the Michigan waters of the western basin of Lake Erie have been monitored with spring trap net surveys. In 2002, total catch per net lift (CPUE) for all species combined was below the long-term mean, but well above the average for the 1990's (Table 5). Smallmouth bass, channel catfish, redhorse sucker, freshwater drum, and quillback carpsucker exhibited CPUE values above the 24 year mean CPUE. The walleye CPUE decreased to the lowest level since 1998, remaining below the long-term mean for the fifth consecutive year. Smallmouth bass catch rates have been relatively high since 1994. This indicates increased abundance since the mid-90's, probably a result of improved habitat conditions for smallmouth bass in Michigan's waters of Lake Erie. Yellow perch CPUE in 2002 increased to the highest level recorded since 1991, indicating yellow perch densities have increased in recent years. However, the yellow perch 2002 CPUE (74.5/lift) remained well below the long-term mean CPUE (153.0) clearly illustrating the long-term trend of lower yellow perch abundances at the spring trap net sites in the 1990's.

Age 3 walleye (1999 year class) accounted for 55% of the trap net walleye catch in 2002 (Figure 11). The 1998, 1997, and 1996 year classes were also well represented, comprising 28% of the total catch in combination. Conversely, the weak 1995 (age 7) year class was very poorly represented in the trap net catch in 2002. Based on mean length-at-age, no trend is evident for Lake Erie walleye growth rates. A total of 2,823 walleye captured in the trap nets were tagged and released as part of the ongoing interagency tagging project.

In 2002, age 6 (1996 year class) was the most abundant year class in the trap net yellow perch catch, accounting for 44% of the total catch (Figure 11). The 1998 and 1997 year classes (age 4 and age 5, respectively) were also well represented, contributing 45% of the total catch. Age specific catch rates for yellow perch from the trap nets, suggest that the 1996, 1997, and 1998 year classes are the strongest yellow perch year classes since the late 1980's.

Since 1978, the MDNR has fished variable mesh multi-filament gill nets at two locations in western Lake Erie each fall, as part of the interagency yearling walleye assessment program. During 2002, a total of 327 walleye was caught in four net lifts. The total walleye catch-per-effort for the index sites (82.0) declined to the lowest level since 1998, well below the mean annual catch per unit effort (cpue) of 125.1 for the time series (Table 6). The age 1 catch rate of 42.8 suggests that the 2001 year class is likely below average in abundance. The combination of a very weak 2000 year class and below average 2001 year class will result in lower walleye abundance for Lake Erie walleye anglers. No trend in walleye growth is obvious from the mean length at age data for walleye taken in the fall index gill net survey.

The forage fish community of Lake St. Clair has been surveyed with bottom trawls each year since 1996 by the MDNR. A total of 16 trawl tows were conducted at the Anchor Bay index trawling site in 2002. The spring samples were dominated by spottail shiner, mimic shiner, yellow perch, and trout-perch (Table 7). The species with highest mean densities in the fall samples were spottail shiner, round goby, yellow perch, and smallmouth bass. Round goby densities in spring and fall samples were the highest observed for the survey time period.

Yellow perch age-specific catch rates for the trawling indicate highly variable recruitment in Lake St. Clair (Table 8). Yellow perch recruitment in 1994, 1996, and 1998 was strong. Alternatively, recruitment was poor in 1992, 1995, 1997, and 2000.

In 2002, the MDNR surveyed the adult fish populations in Anchor Bay, Lake St. Clair with trap nets. Five trap nets were fished throughout the month of May. A total of 5,261 fish representing 23 species were captured during the survey. Rock bass were numerically dominant, accounting for 59% of the total (Figure 12). Other common species in the nets included smallmouth bass, pumpkinseed, walleye, channel catfish, and yellow perch.

Ages were estimated for walleye, smallmouth bass, northern pike, and muskellunge based on interpretation of scale samples. Age composition for those species is presented in Figure 13. The dominant walleye year class was the 1999 year class (Age 3), accounting for 34% of the total catch. The 1998 year class (Age 4) accounted for 70% of the smallmouth bass catch. The 1998 year class (Age 4) was also the most abundant for northern pike, accounting for 37% of the northern pike catch. The muskellunge age composition was more evenly distributed with the 1993, 1994, and 1995 year classes combining for 71% of the total catch. A total of 242 walleye and 272 smallmouth bass were tagged and released at the Anchor Bay trap net site in 2002.

The length frequency of smallmouth bass captured in the trap nets reflects the dominance of the 1998 year class (Figure 14). Smallmouth bass less than legal size (356 mm or 14 inches total length) made up 58% of the catch. The mean age for 19 inch (10 years) and 20 inch (11 years) smallmouth bass indicates the importance of older fish in the population for providing anglers with the opportunity to capture trophy size smallmouth bass.

The trap net survey revealed the abundance of a population of channel catfish in Anchor Bay dominated by trophy size individuals. The average weight of all channel catfish captured during the survey was 7.5 pounds. Nearly 28% of the channel catfish captured in the trap nets (Figure 15) exceeded the minimum size requirement (27 inches total length) for the MDNR Master Angler program. Although anglers are discouraged from keeping large channel catfish for food due to consumption advisories, catch-and-release trophy channel catfish angling opportunites are clearly available in Anchor Bay during the spring. The high abundance of large fish in the catfish length frequency distribution suggests that this population is currently experiencing low exploitation.

Some of the muskellunge captured during the Lake St. Clair trap net survey exhibited raised, reddish, sores. Molecular analysis revealed that these fish were infected with a *Piscirickettsia* bacterium. This type of bacteria has not previously been isolated from muskellunge or other fish species in the Great Lakes. In 2003, we will further explore the rate of infection and the health of infected fish from Lake St. Clair.

A total of 126 lake sturgeon were collected during assessment surveys on the St. Clair River and Lake St. Clair in 2002. Sturgeon captured averaged 48.9 inches in total length, with a range from 17 inches to 69 inches. Ages were estimated for 122 sturgeon based on pectoral fin ray sections. Thirty-seven year-classes were represented with ages ranging from 2 to 52 years. Combined age samples from 1997-2002 indicate that survival of lake sturgeon spawned in the 1970's and 1980's has been fairly consistent, but lake sturgeon spawned in the 1950's and 60's are less abundant (Figure 16). This may be a result of improved water quality after the Clean Water Act of 1972. Restrictive lake sturgeon sport fishing regulations implemented in 1983 by Michigan could also be a factor in the increased survival. A total of 124 lake sturgeon were tagged on the dorsal fin with numbered metal tags and released.

Fish Tagging Studies

In 2002, a total of 6,215 walleye were tagged with non-reward tags by Ontario, Ohio, Pennsylvania, New York, and Michigan at eight Lake Erie sites. A total of 156 non-reward tags placed on fish in 2002 were recovered by fishermen for a single season reporting rate of 2.5%. The 2002 site-specific reporting rate varied from a high of 6.4% at the Sugar Rock site in Ohio, to a low of 1.2% for the Cattaraugus Creek site in New York. The interagency tagging study continues to provide evidence of substantial movement of walleye from spawning locations in Lake Erie through the St. Clair connecting waters (Figure 17).

Legal size walleye (242 fish) and smallmouth bass (272 fish) captured in survey trap nets in Anchor Bay during May, 2002 were tagged and released. A total of 27 walleye tags and 12 smallmouth bass tags have been recovered by anglers and reported to MDNR. A map showing the geographical distribution of walleye and smallmouth bass tag recoveries is presented in Figure 18. On average, recaptured walleyes had

traveled 20.3 km from the Anchor Bay tag site, while smallmouth bass had traveled 15.9 km. The tagged fish of both species recovered by anglers averaged slightly smaller in total length at tagging compared to the tagged population. This difference suggests that the largest individuals of both species were either subject to slightly higher natural mortality or were less vulnerable to capture. The seasonal pattern of tag recoveries differed for the two species. For walleye, the months of June and August produced the majority of recaptures with most August fish being taken in the St. Clair River. Most of the smallmouth bass tags were recovered in July and only one was recovered in the St. Clair River.

There was a large difference in the tag reporting rate between walleye (11.2%) and smallmouth bass (4.4%). We think this is substantial evidence that angler exploitation was significantly higher on walleye. However, it is too early in the tagging portion of the study to evaluate how important variation in angler response was between the two species. We know that catch-and-release fishing for smallmouth bass was very common and may have accounted for a portion of the lower tag detection and/or reporting.

A total of 1,207 lake sturgeon have been tagged and released on the St. Clair River and Lake St. Clair since 1996. To date, fifty-one tagged lake sturgeon have been recaptured. Twenty-two have been recovered with survey setlines in the North Channel. Ten recoveries were reported by sport anglers, including a reported recovery from Lake Erie near Huron, Ohio. Nine recoveries have been reported from the Ontario commercial trap net fishery in southern Lake Huron, approximately 70 km from the tag site. All other recaptures have occurred within 10 km of the tag sites. Although trawling has accounted for the capture of 60% of the sturgeon tagged and released during this study, only seven recoveries (13%), have been from a fish originally caught in a trawl on Lake St. Clair. This may be an indication that fish residing year round in the St. Clair River, or moving north into southern Lake Huron, experience a much higher level of fishing exploitation.

Water Levels

After nearly 30 years of above average water levels, anglers and boaters have experienced below average water levels in the connecting waters and Lake Erie during the last four years. Lower water levels may prove an impediment to sport anglers by restricting boat launching and boat travel to some traditional fishing areas. The effect of lower water levels on fish populations is uncertain. Short-term impacts may be negative. For example, northern pike spawning may be negatively impacted because coastal wetlands are dewatered. Bass spawning beds could also be more visible and more vulnerable to bass anglers. However, low water levels can result in recovery of lost coastal wetland areas. In Lake St. Clair, recovery of beds of emergent rushes is already apparent. Unfortunately, invasive *Phragmites* has also expanded its distribution in the St. Clair Flats area during this period of low water. When water levels return to average or higher, increased coastal wetland habitat will positively impact many of the fish species in the connecting waters.

Sport Fishing Regulations

Walleye in Lake Erie are managed cooperatively with other jurisdictions under a harvest quota system. Reduced spawning success for walleye in Lake Erie has resulted in lower adult walleye abundance in recent years and this trend appears likely to continue. Consequently, walleye harvest quotas will be lower for several years. The daily walleye bag limit in Michigan's waters of Lake Erie will remain a 5 fish daily limit with 1 additional fish, for a total daily limit of 6 fish per day for 2003. This results in consistent Michigan walleye size and daily bag limits for Michigan waters from the St. Clair River to Lake Erie. However, due to harvest exceeding the quota for the Michigan Lake Erie sport fishery in 2002, and low walleye abundances and quotas expected in 2004, the walleye sport fishing regulations in the Great Lakes and connecting waters of Southeast Michigan will likely become more restrictive by 2004.

Lake sturgeon fishing regulations were revised by the MDNR in 1999. Effective, April 1, 1999, harvesting of lake sturgeon is prohibited from Michigan's Great Lakes and connecting waters, except for the St. Clair River and Lake St. Clair. On the St. Clair River and Lake St. Clair, regulations include a "slot" size limit, with a minimum length limit of 1,067 mm (42 inches) and a maximum length limit of 1,270 mm (50 inches), a season bag limit of 1 fish, an open season from July 16 to September 30, and mandatory registration of harvested sturgeon at designated check stations. This "slot" limit will allow a limited

harvest to continue, while protecting sexually mature female fish, and potentially allowing older fish to increase in abundance. No lake sturgeon were registered at the check stations during the 1999 or 2000 harvest seasons. However, three fish were registered during the 2001 harvest season, and six fish were registered in 2002. All were reportedly caught in the North Channel of the St. Clair River.

The open season for smallmouth and largemouth bass fishing in the Michigan portion of the connecting waters (St. Clair River, Lake St. Clair, and Detroit River) is the third Saturday in June to December 31. In recent years, "preseason" fishing for bass has become increasingly popular on these waters. Many anglers are apparently unaware that it is a violation of the Natural Resources and Environmental Protection Act to fish for smallmouth bass during the closed season (Public Act 451 of 1994, Part 487, Sec. 324.48716), even if the angler intends to release any bass caught. The objective of the season closure is to protect bass during the pre-spawning and spawning periods when they are particularly vulnerable to overexploitation. Male bass guard the nest and protect the eggs and fry from predation by other fish. Removing guarding males for just a minute or two has been documented to increase egg and fry predation. In 2003, low water levels may make spawning bass more visible and thus more vulnerable to fishing in Lake St. Clair. We urge bass anglers to show restraint and comply with the existing fishing regulations on the connecting waters.

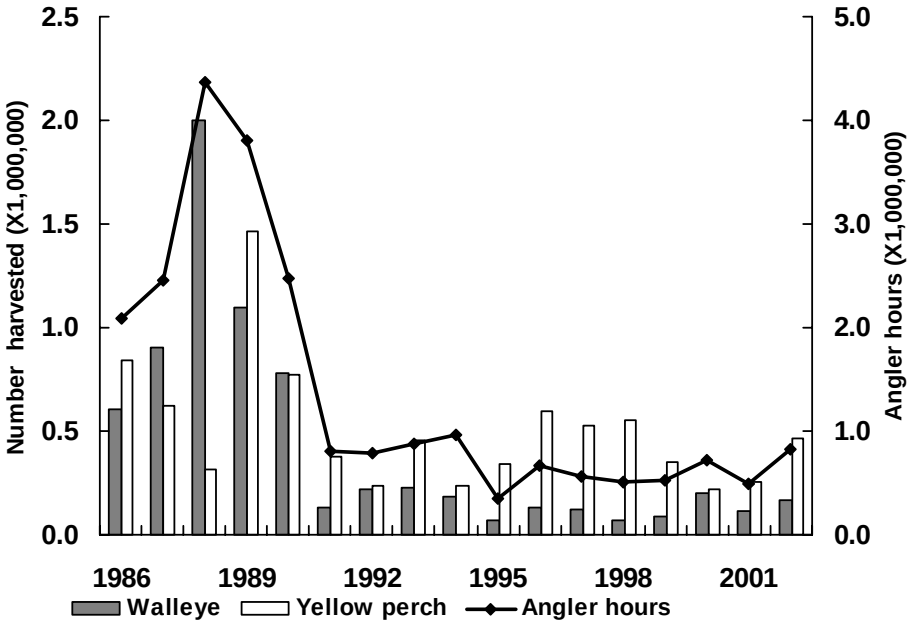


Figure 1.—Estimated harvest and effort for Michigan's Lake Erie sport fishery, 1986-2002.

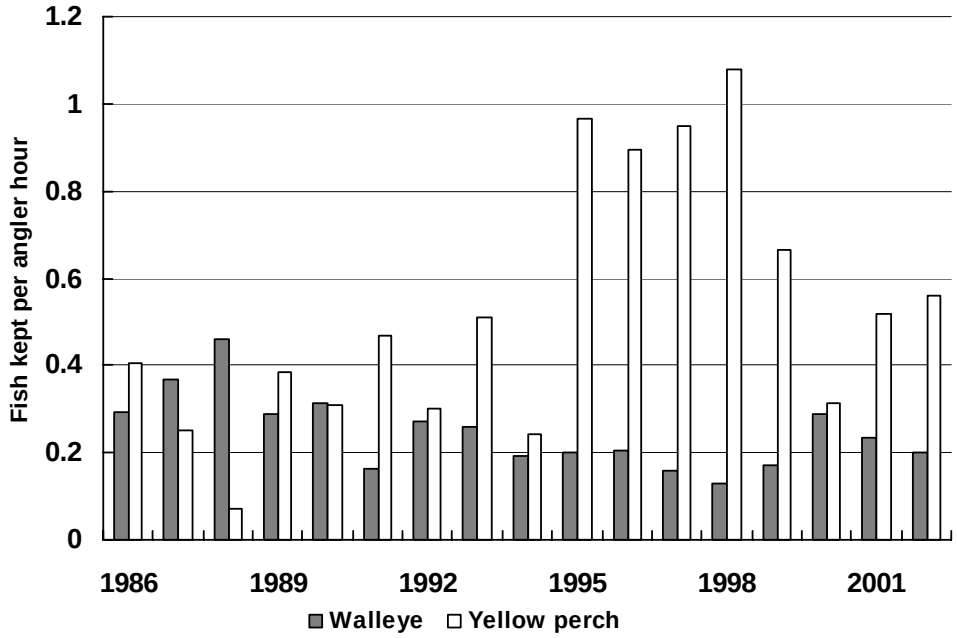


Figure 2.—Walleye and yellow perch catch rates for Michigan's Lake Erie sport fishery, 1986-2002.

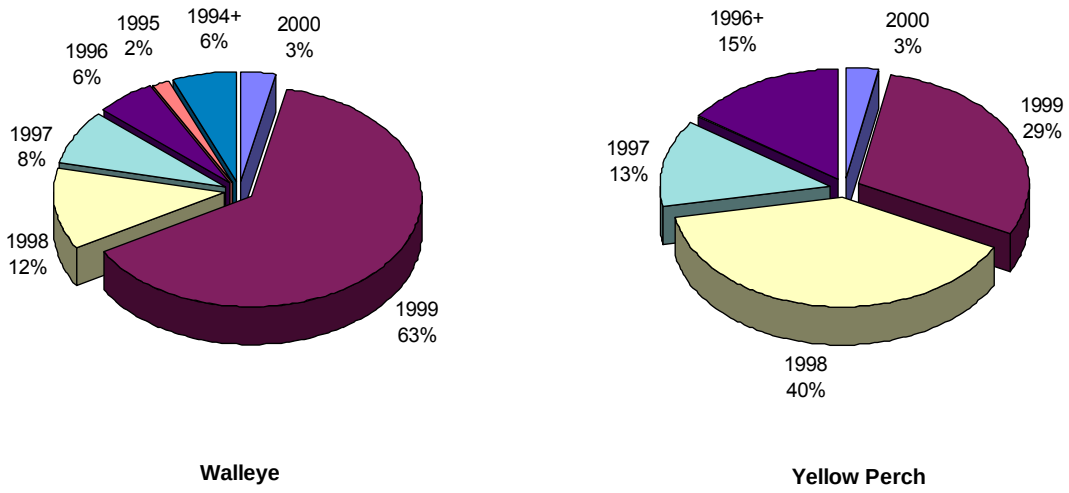


Figure 3. —Year-class contribution to Michigan sport harvest for walleye and yellow perch from Lake Erie in 2002.

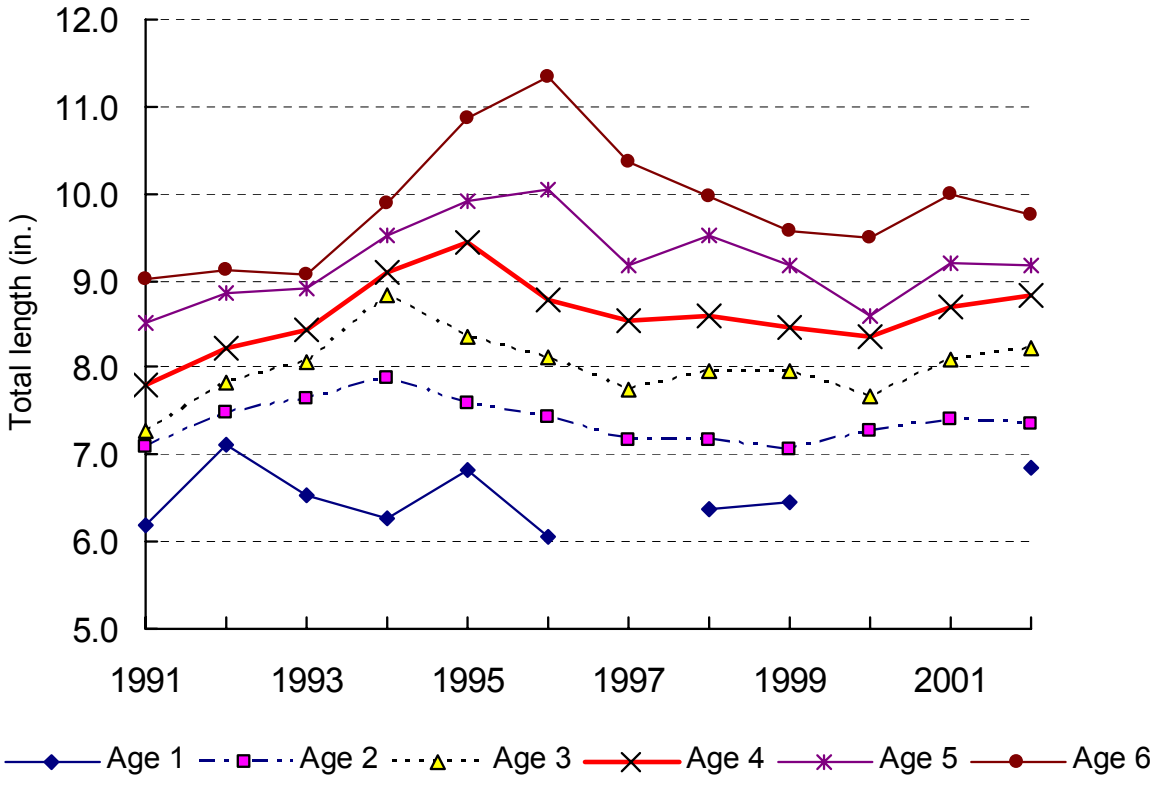


Figure 4. —Mean length at age for sport caught yellow perch from Michigan's waters of Lake Erie, 1991-2002.

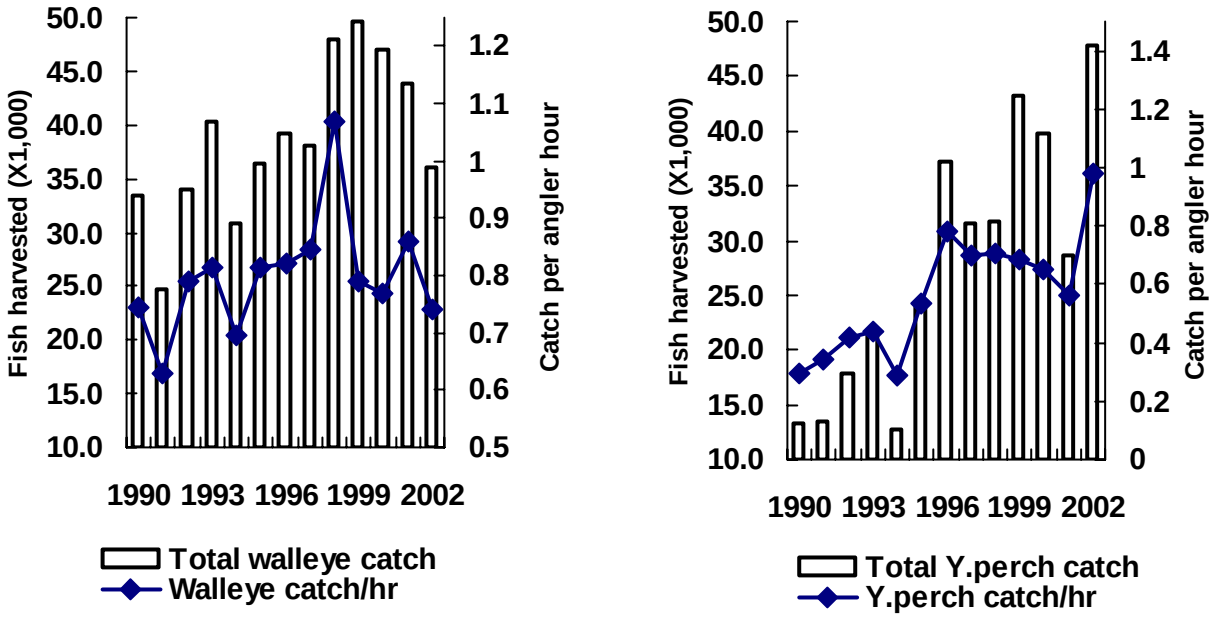


Figure 5. —Michigan charter boat harvest and catch rates for Lake Erie, 1990-2002.

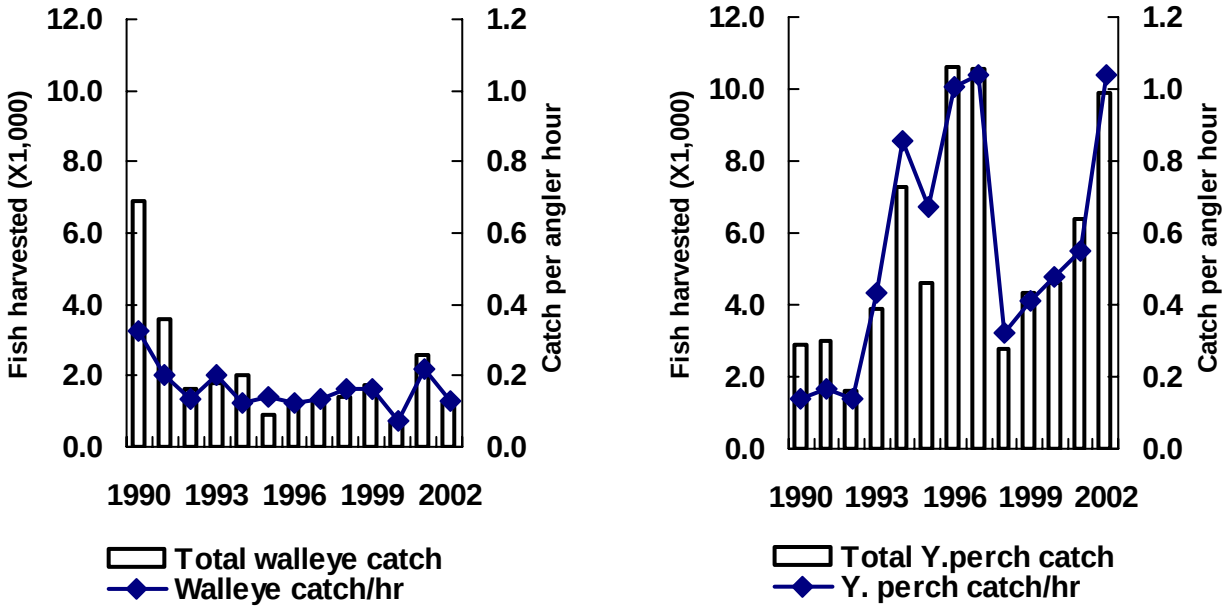


Figure 6. —Michigan charter boat harvest and catch rates for Lake St. Clair, 1990-2002.

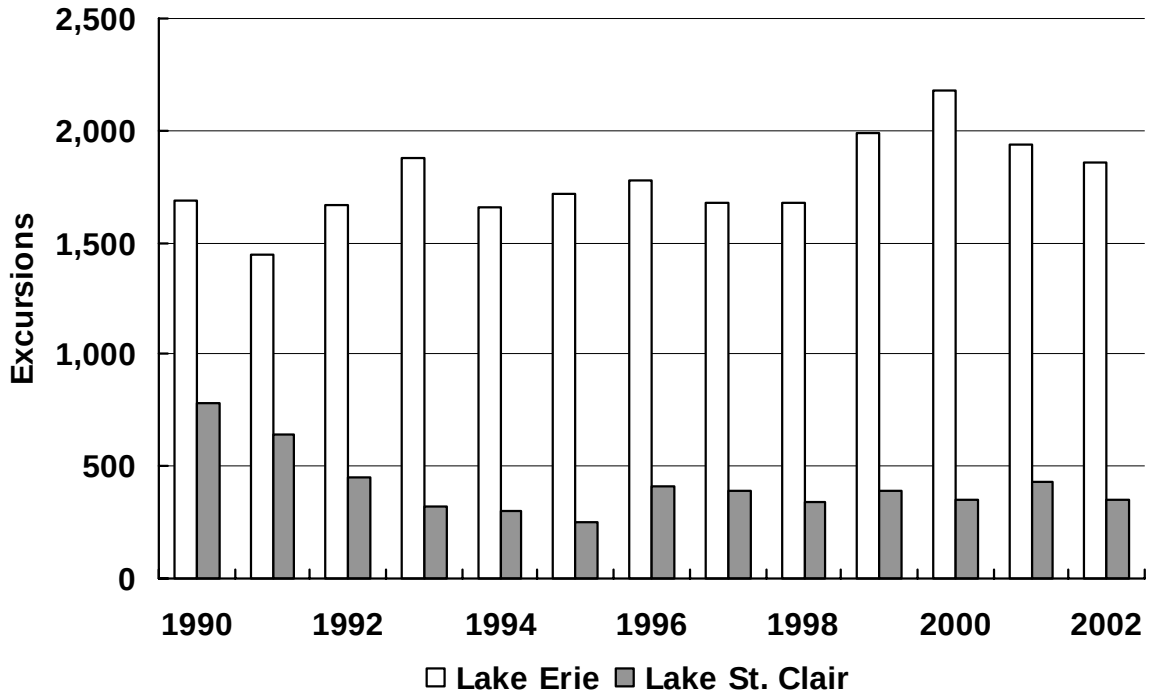


Figure 7.—Reported charter boat excursions on Lake Erie and Lake St. Clair, 1990-2002.

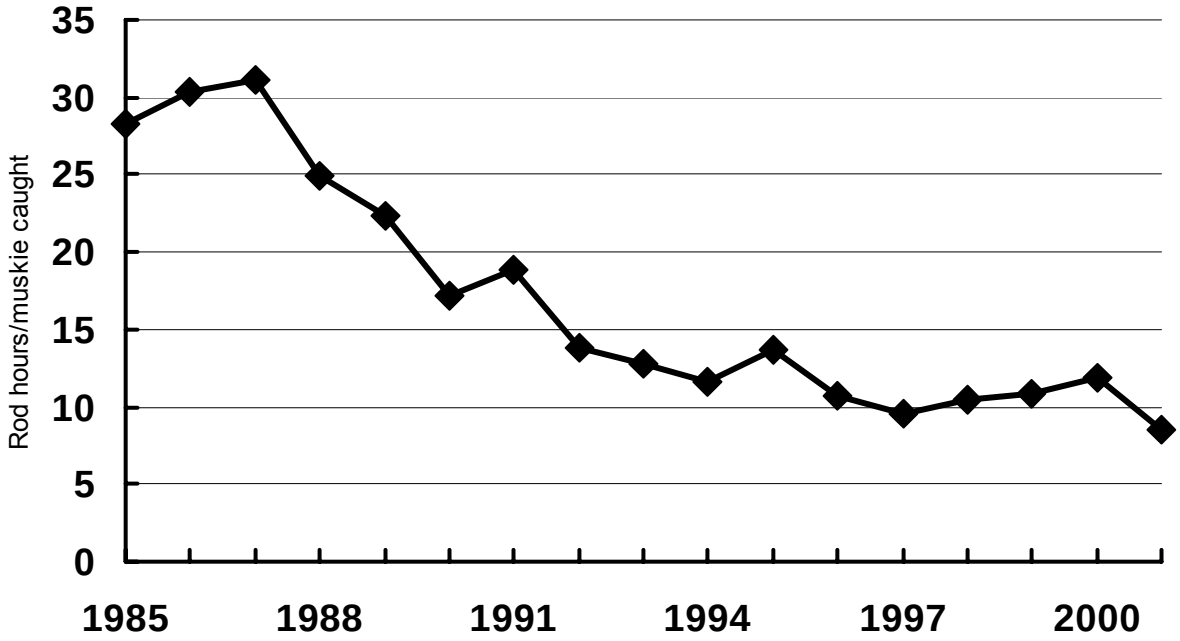


Figure 8.—Lake St. Clair great lakes muskellunge catch rate from Angler Diary Program, 1985-2001.

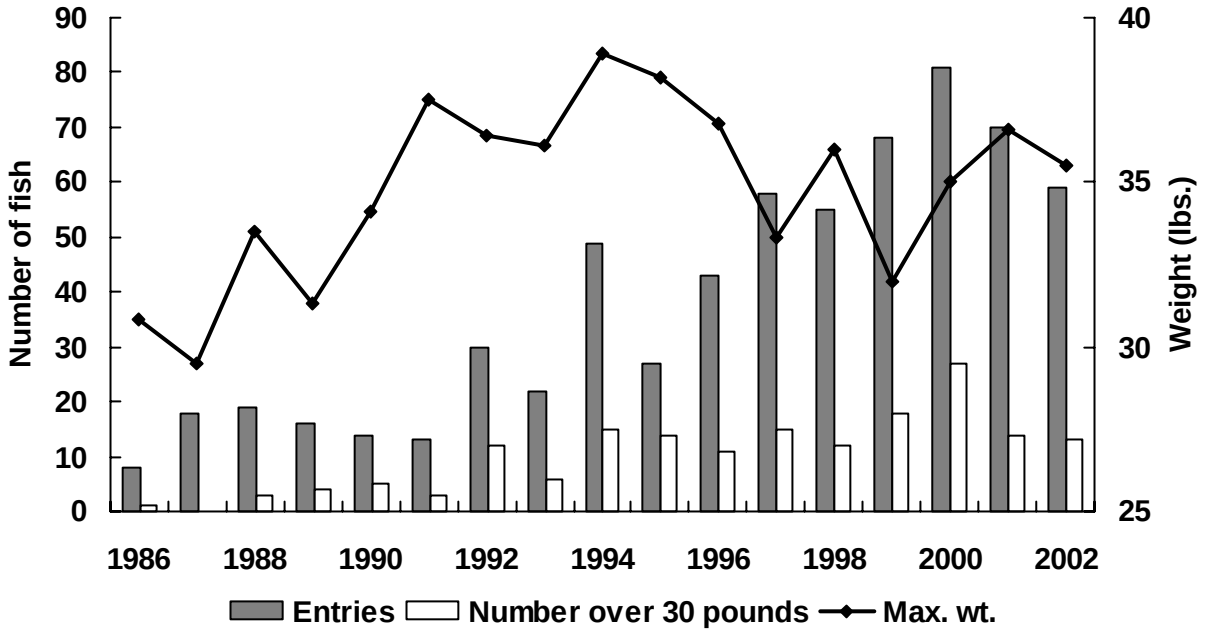


Figure 9.—Lake St. Clair muskellunge entered in the Michigan DNR Master Angler Program, 1986-2002. Values for 1992-2002 represent combined regular and catch-and-release Master Angler categories.

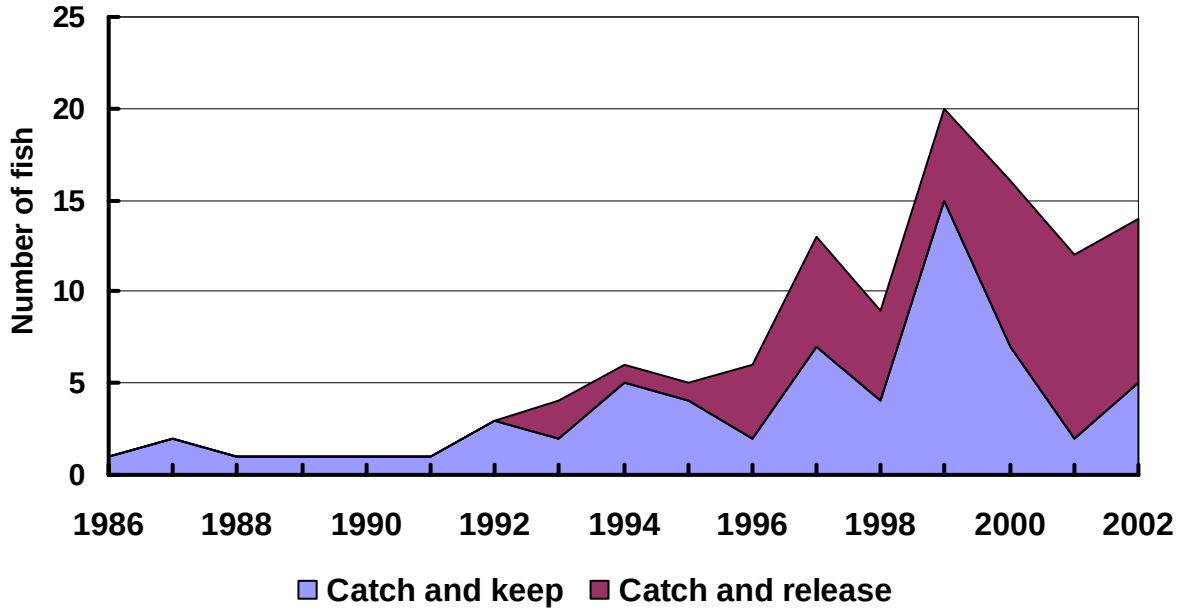


Figure 10.—Lake St. Clair smallmouth bass entered in the Michigan DNR Master Angler Program, 1986-2002. Values for 1992-2002 represent combined regular and catch-and-release Master Angler categories.

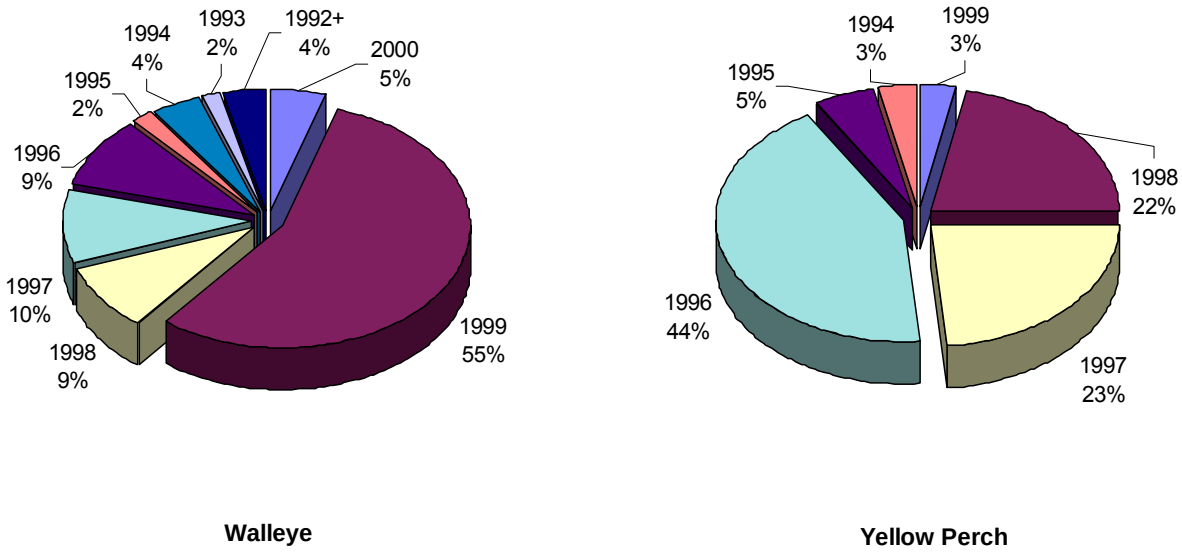


Figure 11. —Contribution by year class to catch in survey trap nets in Lake Erie, April 2002.

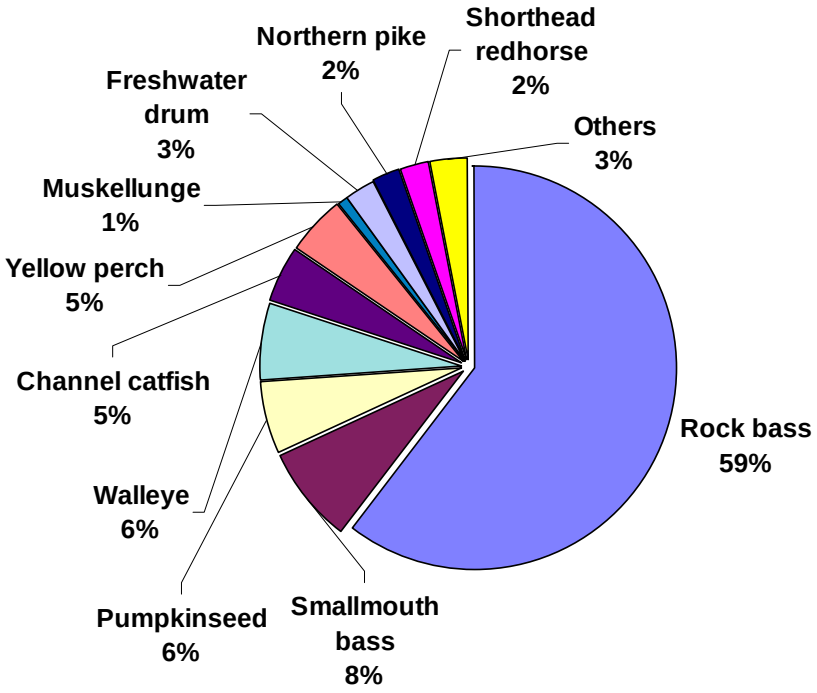
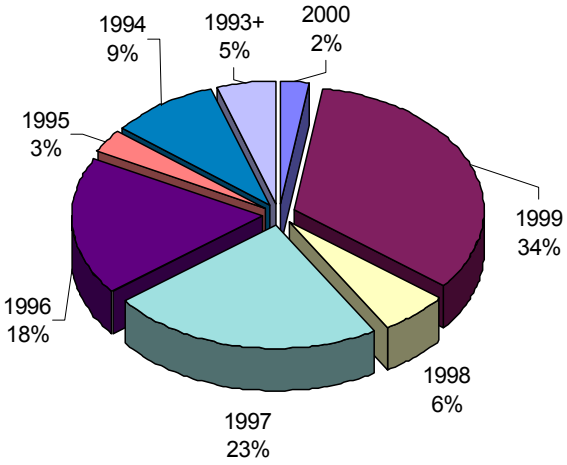
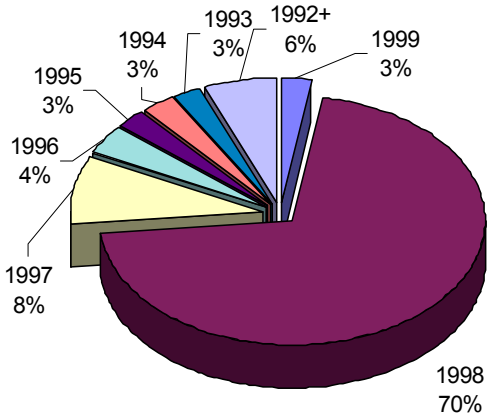


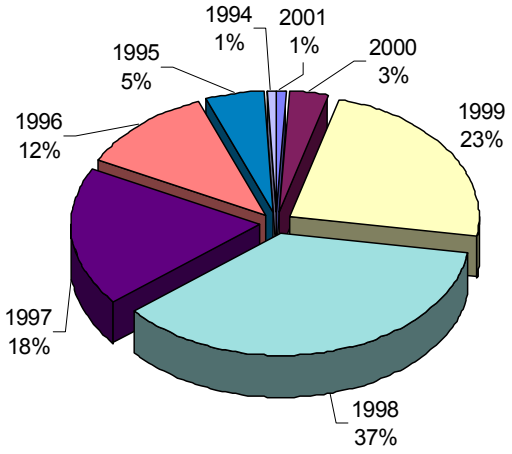
Figure 12. —Catch composition for trap nets fished in Lake St. Clair in May 2002.



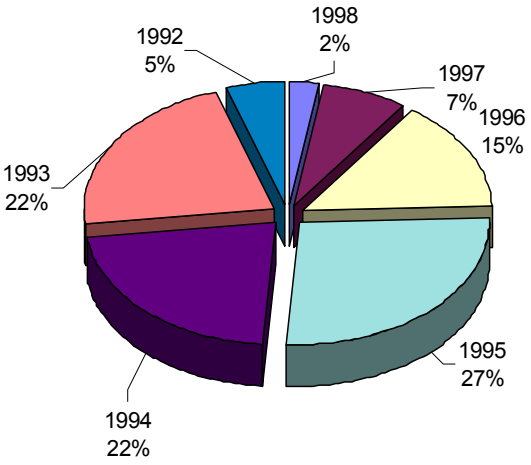
Walleye



Smallmouth bass



Northern pike



Muskellunge

Figure 13. —Year-class contribution for walleye (n=244), smallmouth bass (n=397), northern pike (n=120), and muskellunge (n=41) caught in Lake St. Clair trap nets in 2002.

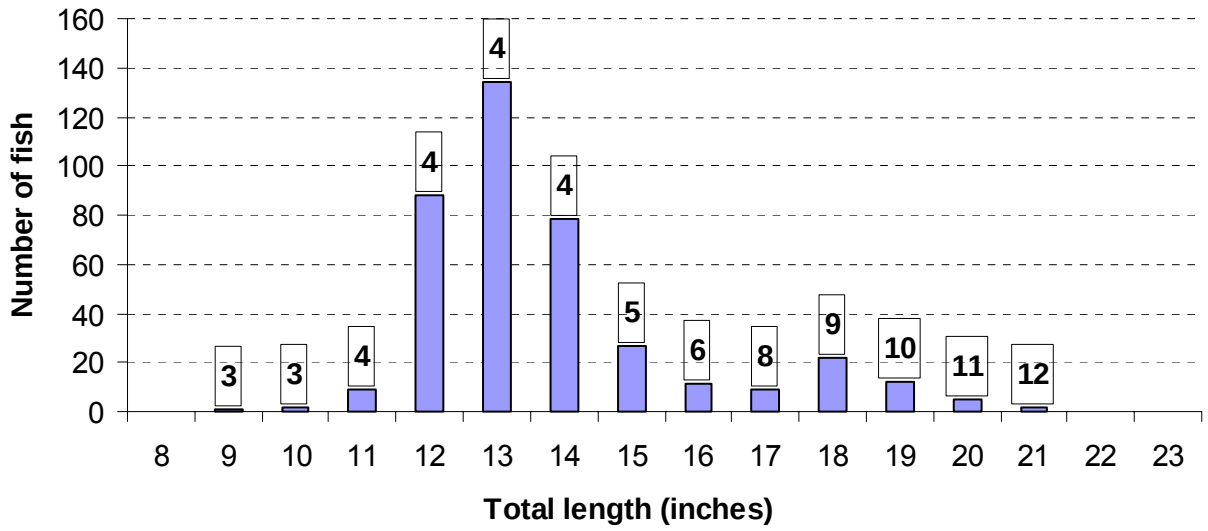


Figure 14. Length frequency of Lake St. Clair smallmouth bass caught in survey trap nets during May 2002. Mean age by inch group is shown in box above corresponding length bar.

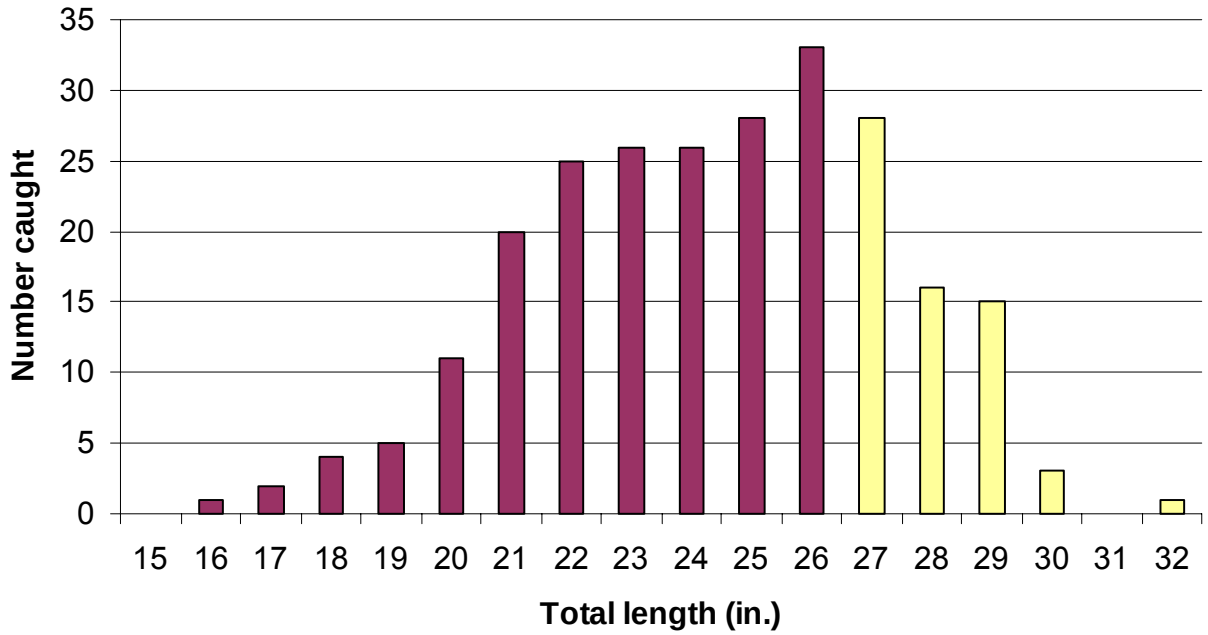


Figure 15. Length frequency of channel catfish caught in Lake St. Clair survey trap nets during May 2002. Master Angler size fish indicated by light bars (27 inches and larger).

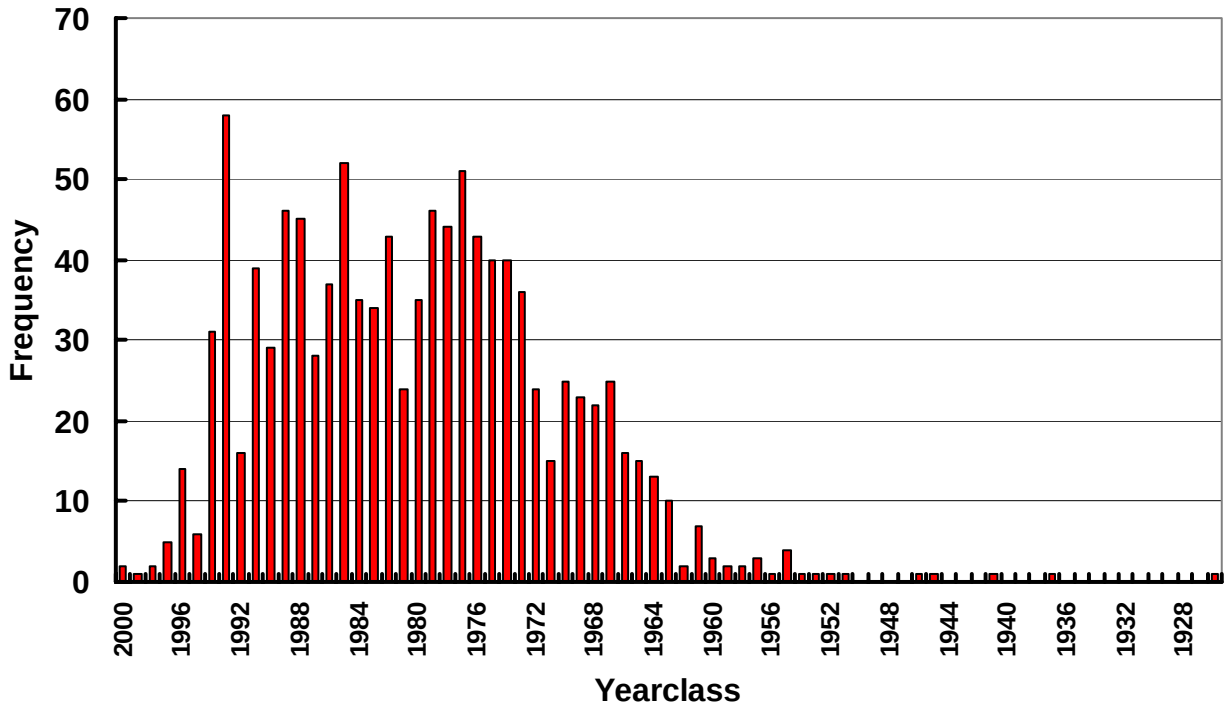


Figure 16. —Year of hatching for lake sturgeon sampled from Lake St. Clair and St. Clair River from 1997 to 2002 by Mt. Clemens Research Station (n=1103).

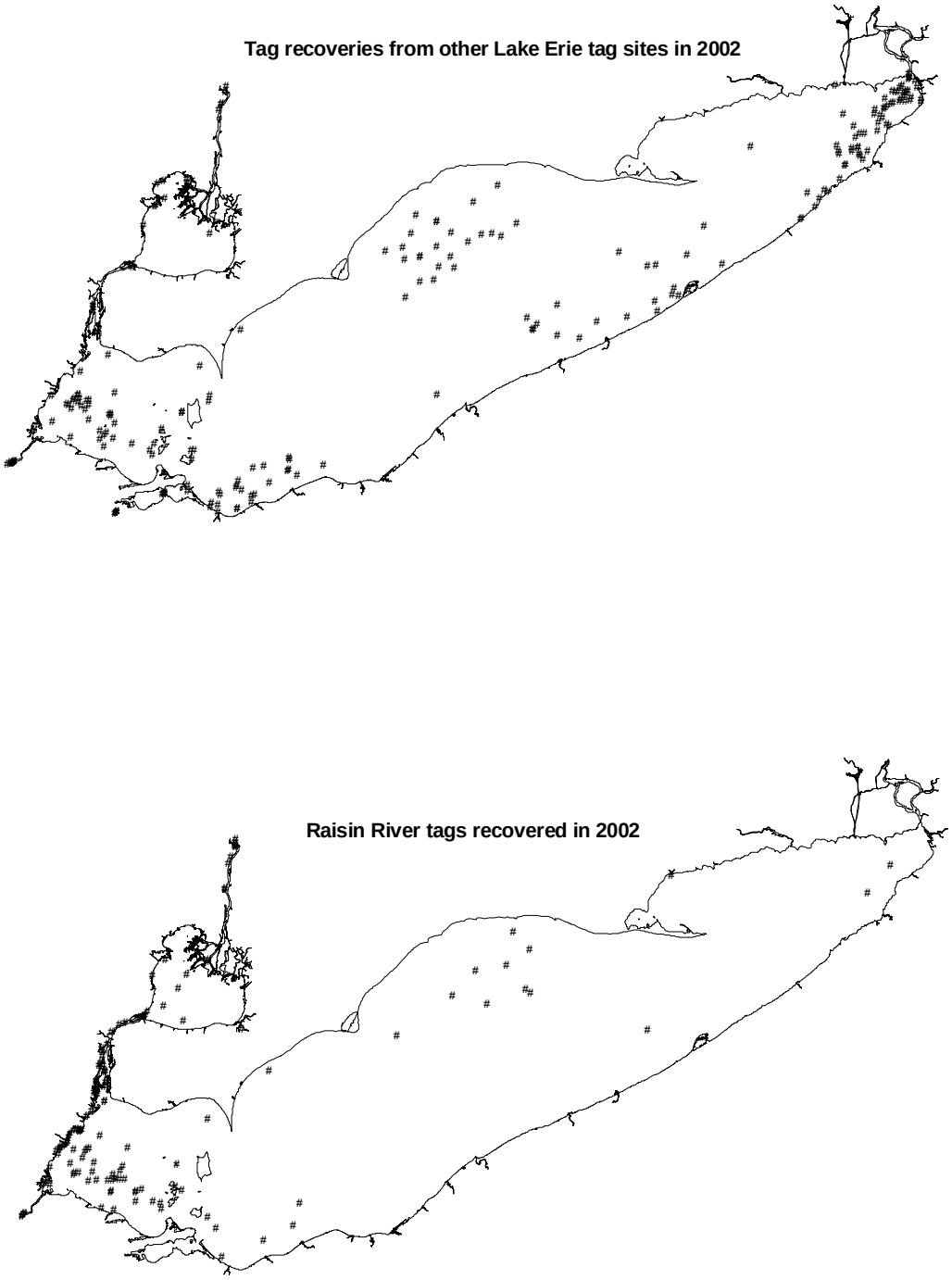


Figure 17.-Geographical distribution of walleye tag recoveries in 2002 from fish tagged during all years at the Raisin River tag site near Monroe, Michigan (138 recoveries in 2002) and other Lake Erie tag sites (228 recoveries in 2002).

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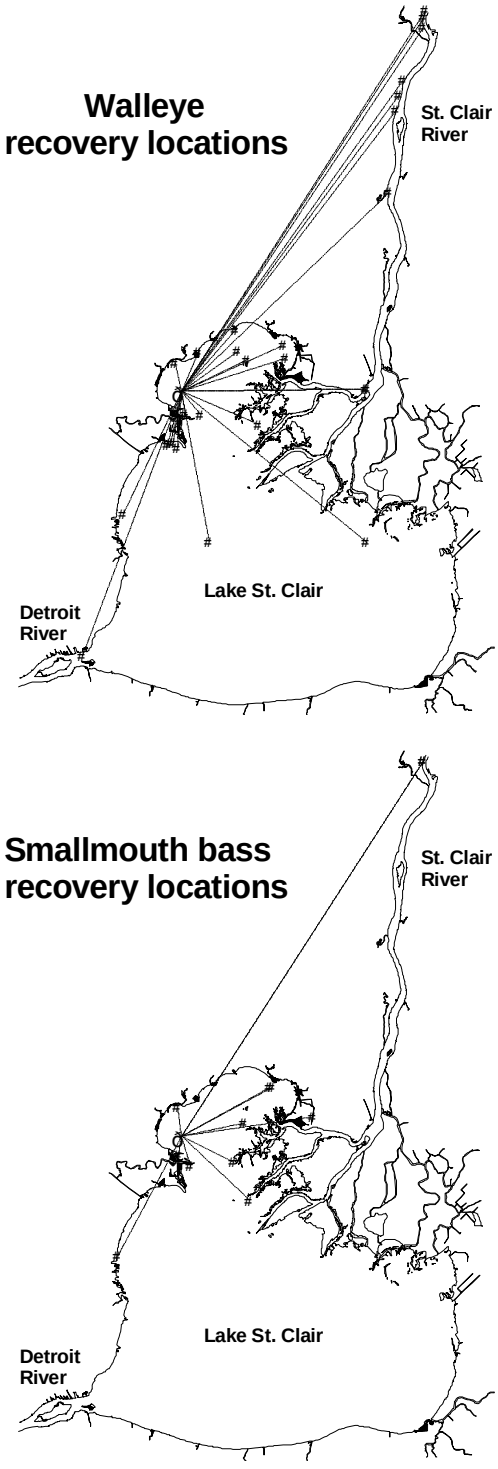

Figure 18.—Geographical distribution of 27 walleye and 12 smallmouth bass tags recovered by anglers fishing in Lake St. Clair and the St. Clair River during the 2002 season.

Table 1.—Estimated sport harvest, catch rate, and effort for Michigan's 2002 Lake Erie non-charter boat fishery. Two standard errors in parentheses.

		Month							
Species	Harvest per hour	Apr	May	Jun	Jul	Aug	Sep	Oct	Season
Yellow	0.5610	255	7,056	32,848	28,372	126,673	213,094	55,867	464,165
Perch	(0.1863)	(1,767)	(13,829)	(57,590)	(34,671)	(78,585)	(89,923)	(33,293)	(141,715)
Walleye	0.2019	1,051	17,163	76,403	66,686	4,531	1,172	47	167,053
	(0.0652)	(1,940)	(11,137)	(31,388)	(35,983)	(4,624)	(1,643)	(123)	(49,314)
White	0.0145	128	5,732	3,895	992	647	470	115	11,979
bass	(0.0145)	(861)	(7,250)	(8,766)	(2,649)	(1,683)	(1,426)	(440)	(11,926)
Channel	0.0096	435	2,066	1,229	1,444	1,388	771	620	7,953
catfish	(0.0102)	(1,596)	(3,555)	(2,988)	(4,512)	(4,461)	(1,526)	(2,016)	(8,413)
Freshwater	0.0026	0	167	921	697	270	82	16	2,153
drum	(0.0049)	(0)	(540)	(2,953)	(2,559)	(994)	(330)	(74)	(4,082)
White	0.0024	0	560	441	655	165	96	59	1,976
perch	(0.0053)	(0)	(2,517)	(1,918)	(2,916)	(843)	(294)	(170)	(4,398)
Smallmouth	0.0014	0	0	315	554	60	221	35	1,185
bass	(0.0036)	(0)	(0)	(1,818)	(2,128)	(384)	(842)	(123)	(2,951)
Bluegill	0.0004	0	0	0	52	174	0	116	342
	(0.0021)	(0)	(0)	(0)	(276)	(1,514)	(0)	(818)	(1,743)
Largemouth	0.0004	0	0	0	330	0	0	0	330
bass	(0.0018)	(0)	(0)	(0)	(1,499)	(0)	(0)	(0)	(1,499)
Rock	0.0002	0	0	0	134	0	10	25	169
bass	(0.0008)	(0)	(0)	(0)	(663)	(0)	(56)	(84)	(671)
Black	0.0002	0	0	0	0	0	0	147	147
crappie	(0.0007)	(0)	(0)	(0)	(0)	(0)	(0)	(615)	(615)
Lake	0.0001	0	55	22	0	0	0	0	77
whitefish	(0.0005)	(0)	(359)	(163)	(0)	(0)	(0)	(0)	(394)
Rainbow	0.0001	0	39	0	29	0	0	0	68
trout	(0.0003)	(0)	(178)	(0)	(206)	(0)	(0)	(0)	(272)
Angler hours		8,437	76,910	287,352	237,240	92,000	99,700	25,717	827,356
		(3,229)	(37,173)	(60,444)	(74,800)	(24,735)	(19,235)	(8,397)	(108,135)
Angler		1,887	14,175	51,571	44,280	19,466	20,652	5,672	157,703
trips		(752)	(6,424)	(10,732)	(13,861)	(5,359)	(4,015)	(1,896)	(19,939)
Angler		1,722	14,050	51,571	44,280	19,416	20,652	5,672	157,363
days		(704)	(6,375)	(10,732)	(13,861)	(5,346)	(4,015)	(1,896)	(19,918)

Table 2. —Total catch per hour, catch per excursion, number caught, and fishing effort (angler hours, trips, and charter excursions) for charter boats on Lake Erie, 2002.

Species	Total catch per hour	Total catch per excursion	Month							Season
			Apr	May	Jun	Jul	Aug	Sep	Oct	
Coho salmon	0.000	0.001	0	0	1	0	0	0	0	1
Rainbow trout	0.001	0.020	2	4	7	4	20	0	0	37
Yellow perch	0.979	25.825	1	184	1,432	726	16,346	24,086	5,076	47,854
Walleye	0.740	19.512	187	3,424	21,415	9,903	480	746	0	36,155
Other	0.024	0.625	1	334	538	179	37	28	42	1,159
Angler hours			351	5,983	22,840	11,291	3,392	4,304	713	48,873
Angler trips			46	1,046	4,410	2,128	649	864	151	9,294
Anglers										
Resident			24	939	3,913	1,826	560	717	130	8,109
Nonresident			22	107	497	302	89	147	21	1,185
Charter excursions			16	229	857	422	131	169	29	1,853

Table 3. —Total catch per hour, catch per excursion, number caught, and fishing effort (angler hours, trips, and charter excursions) for charter boats on Lake St. Clair and the St. Clair River, 2002.

Species	Total catch per hour	Total catch per excursion	Month							Season
			Apr	May	Jun	Jul	Aug	Sep	Oct	
Chin. salmon	0.000	0.000	0	0	0	0	0	0	0	0
Rainbow trout	0.000	0.000	0	0	0	0	0	0	0	0
Brown trout	0.000	0.016	0	0	0	0	0	0	0	0
Yellow perch	1.038	27.775	0	26	836	1,870	1,923	3,250	1,983	9,888
Walleye	0.127	3.390	275	135	185	195	401	16	0	1,207
Other	0.277	7.404	1	41	460	997	780	309	48	2,636
Angler hours			540	366	1,426	2,275	2,383	1,711	826	9,527
Angler trips			90	75	237	360	370	263	136	1,531
Anglers										
Resident			54	30	186	281	286	250	125	1,212
Nonresident			36	47	51	79	90	18	11	332
Charter excursions			26	17	52	81	89	59	32	356

Table 4. —Commercial harvest from Michigan waters of Lake Erie in 2002.

	Carp	Buffalo	Channel catfish	Bullheads	Goldfish	Others[1]	Total
Harvest (lbs.)	336,820	45,367	39,778	6500	4,660	15,800	239,341
% of total	75	10	9	1	1	4	100
Market value	$40,418	$22,684	$21,878	$1,950	$1,631	$2,589	$91,150

[1] 'Others' category includes gizzard shad, freshwater drum, white bass, and quillback.

Table 5. —Mean catch per trap net lift for all species commonly taken during spring trap net surveys in Michigan waters of Lake Erie.

	Survey year												
Species	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Walleye	28.1	49.0	18.1	20.6	38.8	26.1	36.6	75.5	61.7	33.9	83.1	35.9	23.8
Smallmouth bass	0.1	0.0	0.0	0.1	0.2	0.1	0.1	0.1	0.1	0.0	0.1	0.3	0.1
Yellow perch	377.0	320.0	669.0	512.0	146.0	257.0	129.0	156.0	40.3	174.0	22.9	251.5	41.7
Rock bass	1.2	0.8	1.9	0.9	1.5	1.3	1.0	1.5	0.7	1.5	0.9	0.8	0.3
White bass	1.5	1.5	3.7	1.4	10.5	4.9	2.5	2.8	7.6	0.4	5.3	4.7	0.9
White perch	0.0	0.1	0.3	0.5	24.6	35.0	10.9	38.9	30.3	43.5	63.1	233.0	40.5
Pumpkinseed	0.1	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.0
Bluegill	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Black crappie	0.2	0.0	0.2	0.0	0.1	0.0	0.1	0.1	0.2	0.2	0.4	0.2	0.0
Channel catfish	3.5	9.7	5.4	5.8	4.9	10.6	4.6	5.5	5.4	2.7	3.5	4.1	9.0
Brown bullhead	0.2	1.1	1.6	1.9	1.7	4.2	2.5	1.5	4.1	0.9	9.2	3.9	13.1
White sucker	7.8	8.3	7.9	12.2	8.7	6.7	10.2	33.0	10.2	7.0	6.7	2.8	4.3
Redhorse sp.	2.4	1.2	0.6	1.0	0.8	1.5	1.7	1.4	1.3	1.7	1.8	0.6	0.4
Freshwater drum	37.4	66.8	14.0	42.9	13.4	23.5	25.1	30.6	25.3	9.1	15.6	6.4	5.1
Common carp	5.1	26.1	4.7	8.2	6.9	14.9	3.5	2.0	1.9	0.6	6.0	0.6	2.3
Goldfish	4.8	2.4	0.3	0.4	0.4	2.5	0.6	0.2	0.1	0.0	0.2	0.1	0.1
Gizzard shad	4.4	4.7	2.3	3.9	17.8	28.4	18.1	17.4	2.7	2.3	15.9	0.3	2.3
Longnose gar	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Bowfin	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Quillback	4.0	18.6	1.8	2.0	2.4	5.6	2.0	1.9	1.7	1.8	1.5	0.7	1.9
Stonecat	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0
Total	477.9	510.3	731.8	613.9	278.8	422.4	248.7	368.5	193.6	279.7	236.4	546.2	145.8
% yellow perch	78.9	62.7	91.4	83.4	52.4	60.8	51.9	42.3	20.8	62.2	9.7	46.0	28.6
% white perch	0.0	0.0	0.0	0.1	8.8	8.3	4.4	10.6	15.7	15.6	26.7	42.7	27.8
Net lifts	50	46	48	36	37	53	57	51	49	55	51	55	82

Table 5. —Continued.

Species	Survey year											78-89 Mean	90-99 Mean	78-02 Mean
	1991	1992	1993	1994	1995[1]	1996	1997	1998	1999	2000	2002			
Walleye	95.9	37.7	39.2	53.0	26.2	52.0	30.2	34.8	38.0	41.4	35.7	42.3	43.1	42.6
Smallmouth bass	0.2	0.1	0.2	0.8	2.2	2.1	1.2	1.9	1.9	2.2	1.2	0.1	1.1	0.6
Yellow perch	94.6	35.0	50.2	23.2	10.3	36.6	30.7	33.3	61.0	50.1	74.5	254.6	41.5	153.0
Rock bass	0.8	0.5	1.2	1.0	4.1	1.1	0.9	1.0	2.8	0.7	1.1	1.2	1.4	1.2
White bass	1.6	0.5	0.1	1.1	2.1	0.6	2.6	1.3	4.6	4.0	3.0	3.9	1.5	2.9
White perch	56.8	5.1	0.0	14.7	72.8	5.9	10.2	8.7	79.4	54.7	36.3	40.0	29.4	36.0
Pumpkinseed	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0
Bluegill	0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Black crappie	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.1
Channel catfish	6.0	4.6	4.6	5.4	3.7	8.8	4.4	11.4	16.0	5.2	8.0	5.5	7.4	6.4
Brown bullhead	4.3	4.0	1.6	1.1	0.2	1.1	0.4	0.0	1.0	2.9	0.8	2.7	2.7	2.6
White sucker	13.5	14.6	9.0	5.8	7.4	14.0	4.7	15.0	6.0	5.8	6.3	10.1	9.4	9.5
Redhorse sp.	0.6	3.1	3.6	1.8	1.0	5.5	1.9	3.3	2.2	3.8	4.8	1.3	2.3	2.0
Freshwater drum	25.6	8.9	20.7	8.8	13.0	15.4	6.8	28.3	50.4	11.3	42.7	25.8	18.3	22.8
Common carp	2.3	1.3	1.4	3.7	2.9	8.2	0.6	3.1	8.0	12.2	1.6	6.7	3.4	5.3
Goldfish	0.1	0.1	0.0	4.4	0.1	0.5	0.1	0.0	0.1	0.0	0.0	1.0	0.5	0.7
Gizzard shad	0.0	0.6	0.3	0.3	1.7	0.3	0.0	0.0	0.2	2.4	0.1	9.9	0.6	5.3
Longnose gar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bowfin	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Quillback	2.9	4.4	3.2	4.6	6.7	8.9	2.2	7.9	8.5	3.7	20.8	3.7	5.1	5.0
Stonecat	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	305.5	120.5	135.2	129.6	155.2	161.2	96.9	150.0	280.3	200.4	237.0	409.0	167.8	292.6
% yellow perch	31.0	29.0	37.1	17.9	6.2	22.7	31.7	22.2	21.8	25.0	31.4	55.2	24.8	40.3
% white perch	18.6	4.2	0.0	11.3	46.9	3.6	10.5	5.8	28.3	27.3	15.3	11.1	15.7	13.9
Net lifts	29	55	40	45	39	45	57	44	45	51	81	49	48	50

[1]Sampling period delayed two weeks.

Table 6. —Walleye CPUE (number per net lift) in multi-filament gill nets during fall surveys on Michigan waters of Lake Erie.

Year Class	Total CPUE	Survey year																	
		1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
1975	42.8	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1976	18.4	0.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1977	171.0	0.5	0.3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1978	61.6	0.5	1.3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1979	72.4	2.0	0.5	0.5	0.3	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1980	92.7	5.3	2.3	0.5	0.3	0.0	0.3	–	–	–	–	–	–	–	–	–	–	–	–
1981	72.3	3.8	2.8	2.3	0.5	0.3	0.0	–	–	–	–	–	–	–	–	–	–	–	–
1982	306.2	95.8	44.3	28.5	5.3	7.5	3.5	0.5	–	–	–	–	–	–	–	–	–	–	–
1983	34.6	12.0	4.0	5.0	3.5	1.8	1.8	2.0	–	–	–	–	–	–	–	–	–	–	–
1984	147.7	69.8	34.3	20.5	3.5	8.0	8.3	2.0	0.5	0.3	0.5	–	–	–	–	–	–	–	–
1985	177.2	–	98.0	42.5	9.3	14.3	8.5	1.5	1.3	0.8	1.0	–	–	–	–	–	–	–	–
1986	297.5	–	–	96.8	30.3	90.3	43.5	19.5	11.0	3.8	2.0	0.3	–	–	–	–	–	–	–
1987	127.8	–	–	–	4.5	53.8	26.8	20.0	13.8	2.5	3.8	1.0	0.5	0.8	–	0.3	–	–	–
1988	125.0	–	–	–	–	61.5	35.8	9.3	7.3	4.5	4.5	0.5	0.8	0.8	–	–	–	–	–
1989	52.6	–	–	–	–	–	16.0	17.0	10.0	2.8	3.3	1.3	0.8	0.8	0.3	0.3	–	–	–
1990	136.4	–	–	–	–	–	–	54.5	48.0	13.0	16.5	1.5	1.3	1.3	0.0	0.3	–	–	–
1991	194.3	–	–	–	–	–	–	–	63.0	47.3	61.5	11.3	6.8	2.8	1.3	0.3	–	–	–
1992	16.7	–	–	–	–	–	–	–	–	2.0	7.3	2.0	0.3	1.5	2.3	1.0	0.3	–	–
1993	169.7	–	–	–	–	–	–	–	–	–	73.3	71.0	11.8	8.08	3.3	1.5	0.3	0.5	–
1994	130.5	–	–	–	–	–	–	–	–	–	–	63.3	43.0	14.0	4.8	2.8	1.8	0.8	–
1995	8.3	–	–	–	–	–	–	–	–	–	–	–	3.3	1.3	0.8	1.0	0.8	0.8	0.3
1996	177.2	–	–	–	–	–	–	–	–	–	–	–	–	37.5	84.3	30.5	13.3	9.8	1.8
1997	127.2	–	–	–	–	–	–	–	–	–	–	–	–	–	54.3	34.3	20.3	15.3	3.0
1998	76.6.	–	–	–	–	–	–	–	–	–	–	–	–	–	–	26.0	29.5	14.8	6.3
1999	151.8	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	57.0	73.3	21.5
2000	12.8	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6.5	6.3
2001	42.8	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	42.8
Total		190.2	187.8	196.6	57.5	237.5	144.5	126.3	154.9	77.0	173.7	152.2	68.6	68.8	151.4	98.3	123.3	121.8	82.0
Net lifts		4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4

Table 7.– Mean density (number per hectare) for all fish species caught during spring (June) and fall (September or October) with 10 m headrope index trawls in Anchor Bay, Lake St. Clair.

	Spring							Fall						
Species	1996	1997	1998	1999	2000	2001	2002	1996	1997	1998	1999	2000	2001	2002
Alewife	29.2	10.6	2.5	1.9	3.9	2.9	3.0	28.3	30.7	11.5	1.6	2.8	32.3	0.0
Bluntnose minnow	0.7	0.0	0.2	0.0	11.1	10.0	6.8	0.0	33.5	0.2	9.4	14.8	53.8	32.7
Common carp	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.2	0.9	0.0	0.1	0.0	1.1	2.1
Emerald shiner	0.7	0.2	0.0	0.0	5.1	0.0	10.6	3.8	1.1	7.5	0.0	0.0	0.0	0.6
Freshwater drum	6.6	12.5	5.0	2.3	0.7	4.5	0.8	1.1	0.6	0.2	1.4	1.0	2.3	0.2
Johnny darter	21.7	2.8	7.0	0.0	0.2	0.3	0.0	17.7	4.0	0.0	0.0	0.10	0.0	0.2
Lake sturgeon	2.3	0.4	0.0	0.1	0.2	0.0	0.8	1.8	0.0	1.4	0.0	0.1	0.0	0.0
Largemouth bass	0.0	0.0	0.0	0.0	0.1	0.6	0.0	0.0	0.0	0.0	3.0	1.8	16.4	35.5
Logperch	8.8	75.6	83.3	7.6	0.2	1.6	7.5	32.4	40.0	20.6	1.3	5.2	17.5	5.9
Mimic shiner	17.2	26.3	1.6	0.0	13.5	20.4	362.3	267.6	1,094.9	0.2	29.8	14.8	9.6	44.1
Muskellunge	0.0	0.2	0.0	0.1	0.0	0.6	0.8	0.2	0.2	0.0	0.0	0.1	1.1	0.0
Northern pike	0.0	0.4	0.2	0.0	0.1	1.3	0.0	0.0	0.4	0.0	0.1	0.3	0.6	0.6
North. shorthead redhorse	7.7	6.7	0.7	6.9	2.5	3.6	6.8	0.2	0.4	0.2	0.4	0.7	2.3	0.3
Pumpkinseed	0.0	0.6	0.0	0.0	0.0	1.9	0.0	0.2	4.0	0.0	1.6	0.4	5.1	5.4
Quillback	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.1	1.1	0.0	0.7	0.0	1.7
Rainbow smelt	593.0	656.1	4.3	4.0	3.8	61.1	0.0	0.9	16.5	0.2	0.0	1.0	0.0	0.0
Rock bass	43.0	17.5	5.4	1.0	12.8	29.8	38.5	18.3	81.5	0.9	89.0	92.8	39.6	40.8
Round goby	4.8	14.3	28.1	6.0	10.8	1.3	30.2	65.7	9.7	22.2	9.6	10.0	10.2	99.3
Silver lamprey	0.0	0.2	0.0	0.9	0.3	0.0	0.0	0.5	0.0	0.0	0.2	0.0	0.3	0.0
Silver redhorse	0.7	2.3	0.2	0.4	0.9	0.0	2.3	4.5	0.9	0.7	0.0	0.4	1.1	5.7
Smallmouth bass	0.2	3.2	0.5	0.0	0.8	2.9	3.8	13.6	10.6	24.5	10.7	6.1	0.0	51.4
Spottail shiner	178.2	122.6	8.2	68.9	935.4	7.4	5,729.6	17.0	487.2	45.3	200.0	50.5	878.5	2,406.5
Trout-perch	231.2	345.9	98.5	154.0	34.3	11.0	264.9	775.7	92.3	25.8	2.9	0.2	0.0	9.7
Walleye	4.5	10.4	0.9	1.7	1.2	0.6	0.8	7.2	1.3	2.7	0.9	0.8	0.0	11.3
White perch	1.4	0.7	0.0	0.4	13.3	0.6	0.8	16.1	11.7	7.5	0.1	0.1	0.0	13.2
White sucker	5.4	3.7	3.6	0.0	2.5	1.3	61.1	0.5	2.3	0.0	0.3	1.0	0.6	8.0
Yellow perch	1,184.1	560.3	249.7	866.9	157.8	1,131.7	724.5	34.2	26.8	68.8	21.7	40.9	113.8	73.3

Table 8.–Catch rate by age for yellow perch in June index trawl tows on Lake St. Clair.

Year	Total	Survey year								
class	CPUE	1993	1994	1995	1996	1997	1998	1999	2000	2001
1984	0.5	0.1	0.1	0.3	–	–	–	–	–	–
1985	0.2	0.0	0.2	0.0	–	–	–	–	–	–
1986	0.3	0.2	0.1	0.0	–	–	–	–	–	–
1987	1.0	0.0	0.6	0.3	0.1	–	–	–	–	–
1988	4.1	0.9	1.6	0.9	0.3	0.3	–	–	–	–
1989	10.2	2.8	3.7	2.2	1.2	0.3	–	–	–	–
1990	30.1	6.1	4.1	13.4	5.2	1.3	0.3	–	–	–
1991	167.9	51.3	47.0	32.1	18.7	12.9	1.8	0.6	–	–
1992	51.4	1.0	3.4	5.8	11.5	9.6	10.4	1.1	0.1	0.5
1993	579.2	–	56.3	125.8	171.4	113.7	43.0	54.3	1.5	3.3
1994	900.2	–	–	166.2	293.2	348.2	88.1	20.6	8.3	10.6
1995	134.3	–	–	–	21.4	40.7	26.4	32.2	12.3	21.1
1996	258.6	–	–	–	–	33.3	77.1	70.3	11.3	35.3
1997	99.8	–	–	–	–	–	2.7	37.6	5.5	52.8
1998	1,112.0	–	–	–	–	–	–	650.2	114.1	347.7
1999	30.6	–	–	–	–	–	–	–	4.8	25.8
2000	2.7	–	–	–	–	–	–	–	–	2.7